REMARKS

Enclosed is a Request for a Three-Month Extension of Time and the appropriate fee.

The present invention addresses a specific aging process to improve plasma display panel luminescence characteristics and has the capacity of increasing the color temperature and panel luminescence. The present invention provides not only an even flow of discharge gas through partition passageways, but further assures that the discharge gas having a partial steam pressure of no more than 15 Torr is introduced in an aging process and recognizes the particular sensitivity of blue phosphor to steam released by a protective layer.

As noted on Pages 25-26 of the present specification, steam and the like which has been adsorbed by the front and back plates, can be released during a sealing process. A preliminary heating process is used to prevent heat deterioration of the phosphorous layer. Dry air can be circulated, e.g, as noted on Page 21, with a vaporization point of 22°C or less so that heat deterioration of a phosphorous layer (e.g., blue phosphor) that could be caused by steam containing an atmospheric gas will not occur.

The aging process is performed to stabilize illuminous intensity and discharge characteristics. As noted, during this aging process, discharge electrodes are appropriately excited, for example, with an alternating current of 200 volts at 50 Hz, while a discharge gas at a pressure between 100 to 760 Torr, for example, at a pressure of approximately 500 Torr, is introduced between partition walls having a partial steam pressure of no more than 15 Torr.

This procedure of introducing and evacuating the discharge gas having this particular characteristic of a partial steam pressure of no more than 15 Torr, while applying the required discharge voltage in one of a continuous mode or an intermittent mode, assists in stabilizing the

luminous intensity and discharge characteristics of the PDP. The discharge gas can be an inert gas and the discharge electrodes can be of a laminated combination of a conductive metal oxide, for example a transparent metal oxide, and a narrow metal bus electrode.

As a result of the electric discharge, the surface of the phosphorous layer can approach a temperature of approximately 1000°C while the sealing glass is not softened and this can be sustained for an extensive period of time. By providing a dry discharge gas with a partial steam pressure of no more than 15 Torr, the deterioration effects of steam can be minimized. In addition, the PDP is divided by basically a series of parallel partition walls that are offset from a sealing peripheral wall. The ends of the partition walls can be further offset from a peripheral sealing wall (by a gap larger than the distance between partition walls) to provide respective plenium chambers to encourage a uniform flow between the respective passageways existing between the partition walls. Vent holes for introducing exhausting gases can be arranged in different configurations to further encourage the uniform flow of gases.

This aging process includes providing a required discharge voltage to the specific discharge electrodes for a sufficient time period to stabilize the PDP. The discharge gas, which can be a dry inert gas, can be used to circulate continuously or intermittently through the inner space with a partial steam pressure of 15 Torr or less. Preferably, a constant pressure is applied in a continuous mode of application and in an intermittent mode of operation wherein a plurality of discharge periods are utilized in the introduction process of the discharge gas and an evacuating process occurs in the intervals between the discharge periods.

The Office Action contended that Claims 117-118, 120, 122-125, 128, and 130 were completely anticipated by the Inoue, et al. U.S. Patent No. 6,236,159.

The Inoue reference was directed at resolving a problem of removing impurity gases that can be maintained within the partition walls. These impurity gases can be released during the panel sealing process, but can also be re-adsorbed onto the interior surface of the panel. Inoue, et al. noted on Col. 2, Lines 23-26, that the problem of impurity gas contamination can be conventionally resolved by performing an impurity gas expelling operation for a prolonged time period, but this causes an increase in the panel fabrication time thereby lowing productivity of the manufacturing process. Additionally, Inoue, et al. noted the issue of a non-uniform gas flow through the internal structure of the barrier ribs of the PDP.

As can be readily determined from each of the different embodiments, the Inouye, et al. reference recommends providing a gas flow barrier in the peripheral space of the panel to thereby provide a greater gas flow in the inner rib spaces. As can be seen in our present invention, our embodiments disclose a peripheral space, e.g., 66a of a "structure (that) does not impede the circulation of the gas at all." In essence, we provide a large plenium chamber in the peripheral areas to increase the flow and availability of the discharge gas through the smaller intra spaces between the respective partitions. The location of vent holes and barriers to provide directions do not impede the introduction of gas into the peripheral space at one end of the partitions, and the evacuation peripheral space at the other end of the partitions. Compare this teaching with, for example, the first embodiment of the Inoue, et al. reference that suggests as follows:

> "Small gaps are present between the extended ends of the respective barrier ribs 29 and the corresponding interior surfaces of the sealing member 32. The gaps each have a gas flow conductance (also referred to as an "evacuation conductance") <u>smaller</u> than the gas flow conductance of the space between the sealing member and the other end of the barrier rib". (underline added)
>
> See Col. 9, Lines 40-46

These same comments are repeated in the other embodiments such as Col. 11, Lines 11-16, wherein the inner rib spacing is larger than the spacing between the gas flow barrier rib and the inner surface of the sealing member.

In the operation of the Inoue, et al. disclosure, a cleaning gas is introduced when the PDP is placed within an oven. The temperature of the oven is defined with regards to Figure 18, which simply provides a profile and no scale to the temperature range.

Since as is noted in Col. 15, Lines 15-22, one of the impurity gases is H_2O, it would appear that the temperature is above 100°C and it is assumed that the temperature that is implied is the minimum temperature to release gases. As noted in Col. 14, Lines 16-18:

> "Therefore, the PDP1 is kept at the predetermined temperature to cause the impurity gases to be released from the barrier ribs and the like in the PDP1".

In this environment, an inert cleaning gas is introduced to expel the impurity gases released from the barrier ribs. In this evacuation and cleaning gas introduction process, the oven is controlled to cool the PDP to room temperature and the discharge gas is introduced into the PDP at this room temperature.

In the fourth evacuation and gas introduction process of Inoue, et al., a variation of the procedure is disclosed wherein the PDP is placed into an oven with the same panel temperature control as in the earlier first embodiment with the exception that the electric discharge occurs with the cleaning gas being introduced in the PDP at the same temperature for the impurity gas to be released (see Col. 16, Lines 9-19). Presumably, the electric discharge assists in readily releasing impurity gases that may be adsorbed to the surface of the protective layer. As also taught in the Inoue, et al. reference, cleaning discharge electrodes can be positioned in the peripheral space area and then employed to ionize the inert gas for removing impurity gases.

After the cleaning process has occurred, the PDP is cooled to a room temperature, the evacuation valve is closed, and discharge gas is introduced into the PDP to the desired internal pressure for the operation of the PDP.

Thus, in summary, the Inoue, et al. reference teaches a particular arrangement of gas flow barriers that attempt to restrict the flow pattern in the peripheral spaces to be smaller than the inter-rib spaces to maximize flow through the rib spaces. Additionally, a purging of impurity gases occurs in a cleaning step with a PDP heated to a temperature to release impurity gases and, as disclosed in one or more of the embodiments, a discharge voltage is applied to an electrode, such as cleaning electrodes, in the peripheral spaces to ionize the cleaning gas to further assist in removing the impurity gases. This teaching is best described by the patent itself as follows in Col. 8, Lines 34-40.

> "This arrangement offers the following advantages. Since the panel can satisfactorily be evacuated <u>even at a low temperature by causing the electric discharging in the electric discharge space in the panel, the time required for the evacuation and gas introduction process can be shortened in comparison with the prior art, thereby improving the productivity</u>".

Thus, the Inoue, et al. reference teaches away from an extensive aging process. The present invention specifically provides a dry gas, such as dry air, during the sealing process and this feature is neither taught nor suggested by the Inoue, et al. disclosure. After the sealing process, which is only addressed by the Inoue, et al reference, our present invention provides a subsequent aging process of introducing a discharge gas with a partial steam pressure of no more than 15 Torr. This aging process is continuously performed for an extended time period and utilizes an arrangement of peripheral spaces with a width much larger than the width of the distances between the respective partitions. A discharge electrode is utilized and an appropriate

alternating current and frequency provides an elevated temperature to the surface of the phosphorous layer without deteriorating the seal of the glass panels.

Since the Inoue, et al. reference does not address an aging process, and in fact, apparently teaches away from an extended time period for such an aging process, it is believed that the presently pending Claims 111-130 should be allowed. For example, Claim 111 specifically addresses the aging process including the introduction process of a discharge gas with a partial steam pressure of no more than 15 Torr. This same feature is further set forth in the other independent claims.

The Office Action further rejected Claims 111-130 over a combination of the Inoue, et al. reference in view of the MacNair U.S. Patent No. 3,492,598.

The MacNair reference discloses a device for manufacturing a gas discharge device having a cathode member with an alkaline earth carbonate emissive coating.

More particularly, this reference is directed to a laser device that is to operate in a non-oxidizing inert gaseous environment. Needless to say, the present invention is not directed to a structure for supporting a laser, nor is it interested in an improvement in oxidizing an alkaline earth carbonate to avoid the problems of relatively expensive vacuum pumping equipment. Thus, the MacNair reference is offering an alternative procedure to addressing cathode deactivation in such an environment.

Applicant respectfully suggests that since the Inoue, et al. reference teaches away from our present invention, there is no teaching reference that would suggest combining its disclosure with the McNair reference other than an attempt to use the template of our present specification to collect diverse prior art.

Even if we accept a hypothetical combination of the McNair reference, it would fail to resolve the deficiencies of the basic Inoue, et al. disclosure. MacNair teaches the flowing of an inert gas at atmospheric pressure and specifically heating a cathode member to approximately 900°C with a subsequent flash heating at 950°C to convert the alkaline earth carbonates in an emissive coating on a screen to a corresponding oxide. Thus, inert gas flows at an atmospheric pressure so that there will not be any oxidizing reaction with the emissive coating. Reviewing the manner in which the MacNair reference teaches its example in Cols. 3 and 4 clearly discloses that a PDP manufacturing method and apparatus was never contemplated nor taught in this reference, let alone oxidizing an alkaline earth carbonate that has been manufactured at a sintered temperature of 1100°C for two hours in a hydrogen environment.

As noted, an elevated temperature substantially above 900°C was utilized for about an hour. The Inoue, et al. reference specifically was seeking a short, economical production method for a PDP in a preliminary heating procedure at <u>a low temperature</u>. The MacNair reference does not disclose the features set forth in the presently independent claims, and accordingly, it is believed that the present invention is distinguishable over any combination of these references and the case is now in condition for allowance.

If the Examiner believes a telephone interview will help further the prosecution of this case, he is respectfully requested to contact the undersigned attorney at the listed telephone number.

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231 on December 9, 2002.

By: Sandy Malec

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Signature

Dated: December 9, 2002

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VERSION WITH MARKINGS SHOWING CHANGES MADE

IN THE SPECIFICATION

The second paragraph on Page 39 has been amended as follows:

A PDP represented by the number 2 in the table is a PDP relating to this study, which was constructed as shown in Fig. 16, so that the shortest distance between the barrier 81 running at right angles to the partitions 61, and the partition ends 63 is as narrow as possible when compared to the shortest distance between the barrier [81] <u>82</u> running parallel to the partitions 61 and the nearest partition 61. An aging process was performed on this panel in the same way as in the above embodiment.